

Appl. No. 09/557,158
Reply to Office Action of October 24, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claims 1 and 2. (Canceled)

Claim 3. (Currently Amended) The process according to ~~Claim 1 or 2~~ 10, wherein the chromium VI oxide is used in a mixture with said other metal oxides, capable of undergoing redox cycles, in such proportions as to maintain the formation reaction of synthesis gas globally exothermic.

Claims 4 to 6. (Canceled)

Claim 7. (Currently Amended) A The process according to Claim 11, which comprises:

(a) feeding the light hydrocarbon in gas phase to a first fluid bed partial oxidation reactor, containing a solid, comprising CrO₃:

(b) discharging a gas stream essentially consisting of H₂, CO and, optionally, the non-reacted hydrocarbon phase, from the head of the first reactor;

(c) collecting a solid containing chromium III oxide from the bottom of the first reactor and feeding the collected solid to a second fluid bed regeneration reactor maintained at a temperature substantially equal to or lower than the temperature in the oxidation reactor;

(d) feeding a stream of air at high temperature to the bottom of the second regenerator reactor; and

(e) recycling the regenerated solid to the first oxidation reactor.

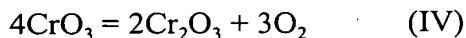
Claim 8. (Original) The process according to Claim 7, wherein in the first fluid bed oxidation reactor a temperature ranging from 800 to 1100° C is maintained, together with a pressure ranging from 0.5 to 5 MPa.

Claim 9. (Previously Amended) The process according to Claim 8, wherein in the second regeneration reactor the same operating conditions present in the first reactor are substantially maintained.

Claim 10. (Currently Amended) A process for the production of synthesis gas, which comprises:

partially oxidizing or autothermally reforming a light hydrocarbon gas with a hexavalent chromium oxide catalyst, supported on an inert carrier and modified with an alkali or alkaline earth metal, as the light hydrocarbon contacts the chromium oxide catalyst and extracts oxygen therefrom thereby being partially reduced, and metal oxides that are the chromium oxide catalyst being capable of autonomously sustaining the catalytic partial oxidation reaction by means of redox cycles.

Claim 11. (Currently Amended) The process according to Claim 10, wherein in the oxidation reaction in an oxidation reactor the hexavalent chromium oxide catalyst is reduced according to the equation:



and wherein the Cr_2O_3 produced by the oxidation of the light hydrocarbon is re-oxidized to CrO_3 by means of air in a reactor maintained at a temperature which is substantially equal to or lower than the temperature in the oxidation reactor.

Claim 12. (Previously Presented) The process according to Claim 10, wherein the light

hydrocarbon is methane ethane, liquified petroleum gas, refinery gas or a naphtha.

Claim 13. (Previously Presented) The process according to Claim 12, wherein the light hydrocarbon is methane.

Claim 14. (Previously Presented) The process according to Claim 10, wherein the inert carrier of the catalyst is microspheroidal alumina modified by the addition of silica thereto.

Claim 15. (Previously Presented) The process according to Claim 14, wherein the microspheroidal alumina has a particle size of 40 to 100 microns and from 0.1 to 10 % by wt of silica is added thereto.

Claim 16. (Previously Presented) The process according to Claim 10, wherein the alkali metal is potassium.

Claim 17. (Previously Presented) The process according to Claim 3, wherein the other metal oxide mixed with the hexavalent chromium oxide is an oxide of copper, manganese, vanadium, cerium, titanium, iron, cobalt, praseodymium, bismuth, zinc, antimony or molybdenum.

Claim 18. (Previously Presented) The process according to Claim 15, wherein the content of chromium trioxide in the catalyst ranges from 1 to 30 wt % and the content of potassium oxide in the catalyst ranges from 1 to 10 wt %, each with respect to the total weight of the catalyst.

Claim 19. (New) The process according to Claim 10, wherein the metal oxides that are capable of autonomously sustaining the catalytic partial oxidation reaction by means of redox cycles are selected from the group consisting of silver oxide, nickel oxide and lead oxide.

Claim 20. (New) A process for the production of synthesis gas, which comprises:
feeding a hydrocarbon stream into a reactor in which a light hydrocarbon gas solely is

partially oxidized or autothermally reformed to a synthesis gas in the presence of hexavalent chromium oxide supported on an inert carrier and modified with an alkali or alkaline earth metal, and metal oxides that are capable of autonomously sustaining the catalytic partial oxidation reaction by means of redox cycles, the hexavalent chromium oxide functioning as a source of oxygen for the oxidation of the light hydrocarbon gas and thereby being partially reduced.